

CLAIMS

1. Nanoclays which comprises layered clay and an intercalation material comprising of a functional organic compound sorbed between layers of said layered clay.
2. Nanoclays as claimed in claim 1 wherein the ratio of said functional organic compound : layered clay is at least 1:20, preferably at least 1:10.
3. Nanoclays as claimed in claim 1 wherein the ratio of said functional organic compound : layered clay is at least 1:5, and most-preferably about 1:4 to achieve efficient intercalation of the functional organic compound between adjacent platelets of the layered clay.
4. Nanoclays as claimed in any preceding claim wherein said functional organic compound comprises one or more carbohydrates.
5. Nanoclays as claimed in claim 4 wherein the source of said one or more carbohydrates is selected from seaweed, a gum, a vegetable or a foodgrain.
6. Nanoclays as claimed in claim 5 wherein said seaweed is *Valonia Ventricosa*.
7. Nanoclays as claimed in claim 5 wherein said vegetable or a foodgrain is potato, tapioca pearls or rice.
8. Nanoclays as claimed in claim 5 wherein said gum is an industrial gum.
9. Nanonoclays as claimed in any one of claims 4 to 8 wherein said carbohydrate is fully or partially dissolved or dispersed in a carrier liquid.
10. Nanonoclays as claimed in claim 9 wherein said carrier liquid is an aqueous alcoholic solvent.
11. Nanonoclays as claimed in any preceding claim wherein said clay is a phyllosilicate.
12. Nanonoclays as claimed in claim 11 wherein said clay is a smectite or bentonite.
13. Nanonoclays as claimed in claim 4 wherein said carbohydrate is selected from chemically modified organic starch, acid modified starch, dextrans, cross-linked starch, starch ethers and starch esters.
14. Nanoclays as claimed in claim 4 wherein said carbohydrate is selected from aligins, okra, industrial gum, pectins, mannans, amylopectins, amylosearabinoxylans, carrageenans, gum arabic, cellulose, chitin, xanthan, galactoglucomannans, glycogens, polydextrose, agars, guar gum, cationic starches, wheat starch, tapioca starch, chitosans, oxidized starches, starch acetates, phosphates and succinates.

15. Nanoclays as claimed in claim 13 wherein said carbohydrate has a molecular weight in the range of 400 to 200000.
16. Nanoclays as claimed in claim 1 wherein said functional organic compound comprises an alcohol having 1 to 24 carbon atoms.
- 5 17. Nanonoclays as claimed in any preceding claim wherein said nanoclay is exfoliated.
18. Exfoliated nanoclay which comprises layered clay and an intercalation material comprising of a functional organic compound sorbed between layers of said layered clay, wherein said nanoclay has been subjected to exfoliation by shearing.
19. A process for the preparation of nanoclays, which comprises intercalating between the
10 adjacent layers of a layered clay a functional organic compound.
20. A process as claimed in claim 19 wherein the ratio of said functional organic compound : layered clay is at least 1:20, preferably at least 1:10.
21. A process as claimed in claim 19 wherein the ratio of said functional organic compound : layered clay is at least 1:5, and most-preferably about 1:4 to achieve
15 efficient intercalation of the functional organic compound between adjacent platelets of the layered clay.
22. A process as claimed in any one of claims 19 to 21 wherein said functional organic compound comprises one or more carbohydrates.
23. A process as claimed in claim 22 wherein the source of said one or more carbohydrates
20 is selected from seaweed, a gum, a vegetable or a foodgrain.
24. A process as claimed in claim 23 wherein said seaweed is Valonia Ventricosa.
25. A process as claimed in claim 23 wherein said vegetable or a foodgrain is potato, tapioca pearls or rice.
26. A process as claimed in claim 23 wherein said gum is an industrial gum.
- 25 27. A process as claimed in any one of claims 22 to 26 wherein said carbohydrate is fully or partially dissolved or dispersed in a carrier liquid.
28. A process as claimed in claim 27 wherein said carrier liquid is an aqueous alcoholic solvent.
29. A process as claimed in any one of claims 19 to 28 wherein said clay is a
30 phyllosilicate.
30. A process as claimed in claim 29 wherein said clay is a smectitie or bentonite.

31. A process as claimed in claim 22 wherein said carbohydrate is selected from chemically modified organic starch, acid modified starch, dextrins, cross-linked starch, starch ethers and starch esters.
32. A process as claimed in claim 22 wherein said carbohydrate is selected from aligins,
5 okra, industrial gum, pectins, mannans, amylopectins, amylosearabinoxylans, carrageenans, gum arabic, cellulose, chitin, xanthan, galactoglucomannans, glycogens, polydextrose, agars, guar gum, cationic starches, wheat starch, tapioca starch, chitosans, oxidized starches, starch acetates, phosphates and succinates.
33. A process as claimed in claim 31 wherein said carbohydrate has a molecular weight in
10 the range of 400 to 200000.
34. A process as claimed in claim 19 wherein said functional organic compound comprises an alcohol having 1 to 24 carbon atoms.
35. A process as claimed in any preceding claim 19 to 34 wherein said nanoclay is subjected to exfoliation by shearing.
- 15 36. A process as claimed in claim 35 wherein said shearing is carried out by mechanical means such as extrusion, injection molding, mixers, vibratory ball milling and ultrasonics.
37. A nanocomposite which comprises a polymer and exfoliated nanoclays dispersed therein.
- 20 38. A nanocomposite as claimed in claim 37 wherein said polymer is selected from plastics, resins and rubber.
39. A process as claimed in claim 37 wherein said polymer comprises one or more melt-processible thermoplastic and/or thermosetting matrix oligomers or polymers or mixtures thereof.
- 25 40. A process as claimed in claim 39 wherein said polymer includes at least ten, recurring monomer units.
41. A process as claimed in claim 39 wherein said polymer includes at least ten, recurring monomer units.
42. A process as claimed in claim 39 wherein said polymer includes at least 30 to 100
30 recurring monomer units.